

MARSH (O.C.)

Letter from x x x

Transmitting, in obedience to law,  
the report on the scientific surveys  
of the Territories, made by the  
National Academy of Sciences -

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LETTER

FROM

O. C. MARSH,

VICE-PRESIDENT AND ACTING PRESIDENT OF THE NATIONAL ACADEMY  
OF SCIENCES,

TRANSMITTING

*In obedience to law the report on the scientific surveys of the Territories,  
made by the National Academy of Sciences.*

DECEMBER 2, 1878.—Referred to the Committee on Appropriations and ordered to be  
printed.

YALE COLLEGE, NEW HAVEN, CONN.,  
November 26, 1878.

SIR: I have the honor to inclose herewith the report on the scientific  
surveys of the Territories, made by the National Academy of Sciences,  
in accordance with the requirement of law contained in the act making  
appropriations for sundry civil expenses of the government, for the fiscal  
year ending June 30, 1879, and for other purposes, approved June 20,  
1878.

This report was adopted by the academy at its last meeting, held in  
New York, November 6, 1878.

Very respectfully, your obedient servant,

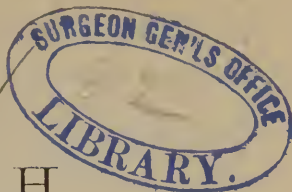
O. C. MARSH,  
*Vice-President and Acting President of the  
National Academy of Sciences.*

To the Hon. the PRESIDENT OF THE SENATE.

At a meeting of the National Academy of Sciences, held in New York,  
November 6, 1878, the acting president of the academy submitted the  
following report from the Special Committee on Scientific Surveys of the  
Territories of the United States:

The committee of the National Academy of Sciences, to whom has  
been referred the consideration of the following requirement of law con-  
tained in the act making appropriations for sundry civil expenses of the  
government for the fiscal year ending June 30, 1879, and for other pur-  
poses, approved June 30, 1878, namely:

And the National Academy of Sciences is hereby required, at their next meeting,  
to take into consideration the methods and expense of conducting all surveys of a sci-  
entific character under the War or Interior Department, and the surveys of the Land  
Office, and to report to Congress, as soon thereafter as may be practicable, a plan for



surveying and mapping the Territories of the United States on such general system as will, in their judgment, secure the best results at the least possible cost; and also to recommend to Congress a suitable plan for the publication and distribution of reports, maps, and documents, and other results of the said surveys,

submit the following report:

The committee consider that the field of inquiry proposed to the academy is intended to embrace only such surveys as pertain to the public domain. They have not included in their plan of organization surveys and investigations, however scientific in method and character, which apply solely to engineering works, such as the improvements of rivers, harbors, lakes, &c.; the irrigation and drainage of public lands, reclamation of tidal lands, and protection of alluvial regions from floods. Such surveys and investigations being inseparably connected with engineering problems, should, in the judgment of the committee, be conducted by the Engineer Corps of the Army. Nor do the committee recommend any change in the organization of the survey of the great lakes, as this is now nearly completed.

The works which seem to fall especially within the limits of the meaning of the law are the geographical surveys west of the one hundredth meridian under the War Department, the United States Geographical and Geological Surveys of the Territories and of the Rocky Mountain Region under the Interior Department, and the system of land surveys under the supervision of the Land Office. Besides these, although not enumerated in the law, one of the most important works now in progress in the interior, under the act of Congress, is the geodetic work of the coast and geodetic survey. Parties of this organization are now conducting a systematic triangulation at several points in the interior, and any general system such as is contemplated in the above law cannot be wisely devised without taking into account the object and organization of this survey. The objects of these various surveys are, 1. An accurate geodetic survey; 2. A general geographical and topographical reconnaissance; 3. Land parceling surveys on which the government can part title to portions of the public domain; 4. The economic classification and valuation of the public domain. To these should be added the gradual completion of a general accurate topographical map of the whole territory of the United States, which shall serve as a basis for all the scientific and practical needs of the government and the people. All this work may be included under two distinct and separate heads: 1. Surveys of mensuration; 2. Surveys of geology and economic resources of the soil.

We will first consider the present operations of the surveys of mensuration. Such surveys are now in progress under five different independent organizations—that of the coast and geodetic survey; of the geographical surveys west of the one hundredth meridian under the War Department; of the topographical work of the two surveys under the Interior Department; and of the land survey under the Land Office. The final object of all these works of mensuration is the accurate determination of position and the laying down of lines and points by measurement. There is at present no co-ordination between these five surveys. Their original determinations of position are independent; their systems of surveys discordant; their results show many contradictions, and involve unnecessary expenditure. The geographical reconnaissances carried on under the War and Interior Departments are of little value for the parceling of land, while the land surveys are of correspondingly slight topographical and geographical value. The operations of the coast and geodetic survey in the interior do not at present include topography and land parceling. To attain the desirable accuracy and economy, it is absolutely

essential that there should be only one geodetic system, one topographical system, and one land-parceling system, all conducted under the same head. It is evident that both topographical and land-parceling surveys, to be properly co-ordinated and sufficiently exact, must be based upon a single rigid geodetic foundation. All these three divisions are departments of measuring, all are based upon accurate determinations of position, and, to be effectively and economically carried out, should be united into one comprehensive system. After a careful consideration of the facilities at the disposal of the several existing organizations engaged in this work, the committee believe that the coast and geodetic survey is practically best prepared to execute the entire mensuration system required. Within the public domain, the dominant interest of the United States is centered in the public lands which remain to be surveyed and sold. The administration of these lands, consisting of 1,101,107.18 acres, is necessarily within the Department of the Interior, while the coast and geodetic survey, having been originally inaugurated to meet the wants of commerce, has been hitherto under the Treasury Department. In view of the paramount importance of the public lands, the committee recommend that the coast and geodetic survey be transferred from the Treasury Department to the Department of the Interior, retaining its original field of operations, and assuming also the entire mensuration of the public domain, and that, so modified and extended, it hereafter be known as the United States Coast and Interior Survey. This organization would then embrace, in addition to its former work, a geodetic survey of the whole public domain, a topographical survey comprising detailed topographical work and rapid reconnaissance, and land-parceling surveys. The Superintendent of the Coast and Interior Survey should be appointed by the President, and should report directly to the Secretary of the Interior.

The best interests of the public domain require, for the purposes of intelligent administration, a thorough knowledge of its geological structure, natural resources, and products. The domain embraces a vast mineral wealth in its soils, metals, salines, stones, clays, &c. To meet the requirements of existing laws in the disposition of the agricultural, mineral, pastoral, timber, desert, and swamp lands, a thorough investigation and classification of the acreage of the public domain is imperatively demanded. The committee, therefore, recommends that Congress establish, under the Department of the Interior, an independent organization, to be known as the United States Geological Survey, to be charged with the study of the geological structure and economical resources of the public domain, such survey to be placed under a director, who shall be appointed by the President, and who shall report directly to the Secretary of the Interior.

It should be specially provided that the director and members of the geological survey, charged as they are with the investigation of the natural resources of the public domain, shall have no personal or private interests in the lands or mineral wealth of the region under survey, and shall execute no surveys or examinations for private parties or corporations.

Officers of the Army and Navy, when not otherwise employed, might be detailed by the Secretary of War, or of the Navy, to take part in the operations of the general survey.

With the inauguration of the two surveys above defined, the committee recommend a discontinuance, first, of the present geographical and geological surveys west of the one-hundredth meridian under the War Department, except surveys necessary for military purposes and local



internal improvements; second, of the geographical and geological surveys now in progress under the Department of the Interior; and, third, of the present land surveys under the Land Office.

The effect of the above changes will be to maintain within the Interior Department three distinct organizations: First, the Coast and Interior Survey, whose function will embrace all questions of position and mensuration; second, the United States Geological Survey, whose function will be the determination of all questions relating to the geological structure and natural resources of the public domain; third, the Land Office, controlling the disposition and sale of the public lands, including all questions of title and record. With this division should be secured a perfect co-ordination and co-operation between the three branches. The Land Office should call upon the Coast and Interior Survey for all surveys and measurements required for the sale and disposition of land. The Land Office should also call upon the United States Geological Survey for all information as to the value and classification of lands. The results of all the mensuration surveys, as soon as completed, should be immediately available for the Land Office and for the Geological Survey and for other branches of the government, as required. The Geological Survey should be authorized to execute local topographical surveys for special purposes, such, for instance, as the subterranean surveys of mining districts and metallic deposits, &c.

Each of the three organizations thus defined should make an annual report of its operations to the Secretary of the Interior. The publications of the Land Office should embrace reports of its business operations relating to the disposition and sale of land, together with the necessary maps. The publications of the Coast and Interior Survey, besides the annual report of operations, should consist of its geodetic results, geographical, topographical, and cadastral maps, coast charts, and such discussions and treatises connected therewith as the superintendent shall deem of value. The publications of the Geological Survey should consist of an annual report of operations, geological and economic maps, illustrating the resources and classification of the land, reports upon general and economical geology in all its branches, with the necessarily connected paleontology.

All collections made by the Coast and Interior and the Geological Surveys, when no longer needed for the investigations in progress, should be transferred to the National Museum.

The committee recommends that upon the organization of the United States Coast and Interior Survey and the United States Geological Survey, a commission be formed, to consist of the Commissioner of the Land Office, Superintendent of the Coast and Interior Survey, Director of the United States Geological Survey, the Chief of Engineers of the Army, and three other persons to be appointed by the President, who shall take into consideration the codification of the present laws relating to the survey and disposition of the public domain, and who shall report to Congress within one year a standard of classification and valuation of the public land, together with a system of land-parceling survey. The necessity of this commission is evident from the fact that by far the larger part of the public domain lies in the region where, from geological and climatic causes, the lands are for the most part not valuable for field-culture, and where the system of homestead pre-emption and sale in accordance with existing laws is both impracticable and undesirable.

In regard to publications of the two surveys above defined, the committee recommend that, besides the number of copies of each report which Congress may order for its own distribution, three thousand

copies be published for scientific exchanges by the heads of these surveys and for sale at the price of publication; that all literary and cartographic material received by the heads of these surveys in exchange be the property of the United States and form a part of the libraries of the two organizations; that the money resulting from the sale of these publications be covered into the Treasury.

The committee recommend that the annual report of operations of the two surveys accompany the report of the Secretary of the Interior; that the special memoirs and reports of both surveys be issued in uniform quarto series; that the style and scale of the cartographic publications be determined by the head of each organization, so as to express the scientific results in the most effective and economical manner.

All of which is respectfully submitted.

O. C. MARSH,  
*Vice-President and Acting President.*  
 JAMES D. DANA,  
 WILLIAM B. ROGERS,  
 J. S. NEWBERRY,  
 W. P. TROWBRIDGE,  
 SIMON NEWCOMB,  
 ALEX. AGASSIZ,  
*Members of the Committee.*

NEW YORK, November 6, 1878.

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At the meeting of the National Academy of Sciences, held in New York, November 6, 1878, the above report was adopted.

O. C. MARSH,  
*Acting President.*

J. H. E. COFFIN,  
*Home Secretary.*  
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